

We claim:

1 1. A method to coordinate interconnected information storage and retrieval
2 systems, wherein each of the information and storage systems is capable of
3 communicating with one or more host computers, comprising the steps of:
4 providing one or more interconnected information storage and retrieval systems;
5 providing a plurality of controllers, wherein one or more of said plurality of
6 controllers is disposed in each of said one or more information storage and retrieval
7 systems;
8 designating one of said plurality of controllers as a master controller and the
9 remaining controllers as target controllers;
10 generating one or more master controller commands by said master controller;
11 providing said one or more master controller commands to each of said target
12 controllers, wherein said one or more master controller commands cause said target
13 controllers to adjust the flow of data into and out of each of said one or more information
14 storage and retrieval systems.

1 2. The method of claim 1, further comprising the step of providing by said
2 master controller to each of said target controllers one or more master controller
3 commands causing each of said target controllers to stop accepting write operations from
4 said one or more host computers.

1 3. The method of claim 1, further comprising the step of providing by said
2 master controller to each of said target controllers one or more master controller

3 commands causing each of said target controllers to form one or more consistency
4 groups.

1 4. The method of claim 3, wherein each of said information storage and
2 retrieval systems is capable of providing information to one or more remote storage
3 locations, further comprising the step of providing by said master controller to each of
4 said target controllers one or more master controller commands causing each of said
5 target controllers to stop providing data to said one or more remote storage locations.

1 5. The method of claim 1, further comprising the steps of:
2 providing a host computer policy command to said master controller; and
3 providing at a first time by said master controller to each target controller one or
4 more first master controller commands; and
5 providing at a second time by said master controller to each target controller one
6 or more second master controller commands.

1 6. The method of claim 1, further comprising the step of providing status
2 information to said master controller by each target controller.

1 7. An article of manufacture comprising a computer useable medium having
2 computer readable program code disposed therein to coordinate controllers disposed in
3 one or more interconnected information storage and retrieval systems, wherein each of
4 the multiple information and storage systems is capable of communicating with one or
5 more host computers, the computer readable program code comprising a series of
6 computer readable program steps to effect:

7 receiving a designation as a master controller and a designation that the remaining
8 controllers comprise target controllers;
9 generating one or more master controller commands;
10 providing said one or more master controller commands to each of said target
11 controllers, wherein said one or more master controller commands cause said target
12 controllers to adjust the flow of data into and out of each of said one or more information
13 storage and retrieval systems.

1 8. The article of manufacture of claim 7, said computer readable program
2 code further comprising a series of computer readable program steps to effect providing
3 to each of said target controllers one or more master controller commands causing each
4 of said target controllers to stop accepting write operations from said one or more host
5 computers.

1 9. The article of manufacture of claim 7, the computer readable program
2 code comprising a series of computer readable program steps to effect providing to each
3 of said target controllers one or more master controller commands causing each of said
4 target controllers to form one or more consistency groups.

1 10. The article of manufacture of claim 7, wherein each information storage
2 and retrieval system is capable of providing data to one or more remote storage locations,
3 the computer readable program code comprising a series of computer readable program
4 steps to effect providing to each of said target controllers one or more master controller
5 commands causing each of said target controllers to stop providing data to said one or
6 more remote storage locations.

1 11. The article of manufacture of claim 7, said computer readable program
2 code further comprising a series of computer readable program steps to effect:
3 receiving a host computer policy command;
4 providing at a first time to each target controller one or more first master
5 controller commands; and
6 providing at a second time to each target controller one or more second master
7 controller commands.

1 12. The article of manufacture of claim 7, said computer readable program
2 code further comprising a series of computer readable program steps to effect receiving
3 status information from each target controller.

1 13. A computer program product usable with a programmable computer
2 processor having computer readable program code embodied therein to coordinate a
3 plurality of controllers disposed in one or more interconnected information storage and
4 retrieval systems, wherein each of the multiple information and storage systems is
5 capable of communicating with one or more host computers, comprising:
6 computer readable program code which causes said programmable computer to
7 receive a designation as a master controller and a designation that the remaining
8 controllers comprise target controllers;
9 computer readable program code which causes said programmable computer to
10 generate one or more master controller commands;
11 computer readable program code which causes said programmable computer to
12 provide said one or more master controller commands to each of said target controllers,

13 wherein said one or more master controller commands cause said target controllers to
14 adjust the flow of data into and out of each of said one or more information storage and
15 retrieval systems.

1 14. The computer program product of claim 13, further comprising computer
2 readable program code which causes said programmable computer to provide to each of
3 said target controllers one or more master controller commands causing each of said
4 target controllers to stop accepting write operations from said one or more host
5 computers.

1 15. The computer program product of claim 13, further comprising computer
2 readable program code which causes said programmable computer to provide to each of
3 said target controllers one or more master controller commands causing each of said
4 target controllers to form one or more consistency groups.

1 16. The computer program product of claim 13, wherein each of said
2 information storage and retrieval systems is capable of sending information to one or
3 more remote storage locations, further comprising computer readable program code
4 which causes said programmable computer to provide to each of said target controllers
5 one or more master controller commands causing each of said target controllers to stop
6 sending data to said one or more remote storage locations.

1 17. The computer program product of claim 13, further comprising:
2 computer readable program code which causes said programmable computer to
3 receive a designation as a master controller;

4 computer readable program code which causes said programmable computer to
5 receive a host computer policy command;
6 computer readable program code which causes said programmable computer to
7 provide at a first time to each of the target controllers one or more first master controller
8 commands; and
9 computer readable program code which causes said programmable computer to
10 provide at a second time to each of the target controllers one or more second master
11 controller commands.

1 18. The computer program product of claim 13, further comprising computer
2 readable program code which causes said programmable computer to receive status
3 information from each of said target controllers.

1 19. A controller disposed in a first data storage and retrieval system, wherein
2 said controller is capable of communicating with other interconnected data storage and
3 retrieval system controllers, comprising:
4 one or more master controller commands to form one or more consistency groups;
5 logic to communicate said one or more master controller commands to a second
6 controller disposed in a second data storage and retrieval system; and
7 logic to receive status information regarding said one or more consistency groups
8 from said second controller.

1 20. A data storage and retrieval system comprising a controller, wherein said
2 controller comprises:
3 one or more master controller commands to form one or more consistency groups;

4 logic to communicate said one or more master controller commands to a second
5 controller disposed in a second data storage and retrieval system; and
6 logic to receive status information regarding said one or more consistency groups
7 from said second controller.